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HMC224MS8

GaAs MMIC T/R SWITCH 5.0 - 6.0 GHz

Typical Applications

The HMC224MS8 is ideal for:

- UNII & HiperLAN
- PCMCIA WirelessLAN

Features

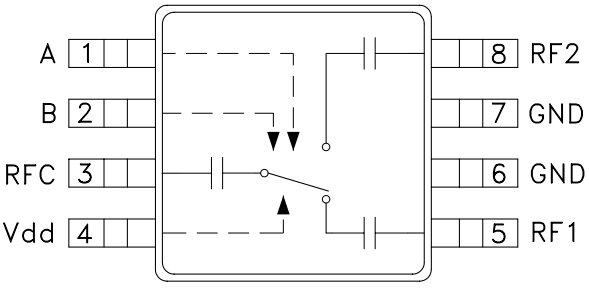
Low Cost 5-6 GHz Switch

Ultra Small Package: MSOP8

High Input P1dB: +33 dBm

Single Positive Supply: +3 to +8V

Functional Diagram



General Description

The HMC224MS8 is a low-cost SPDT switch in an 8-lead MSOP package for use in transmit-receive applications. The device can control signals from 5.0 to 6.0 GHz and is especially suited for 5.2 GHz UNII and 5.8 GHz ISM applications with only 1.2 dB loss. The design provides exceptional power handling performance; input P1dB = +33 dBm at 5 Volt bias. RF1 and RF2 are reflective shorts when "Off". On-chip circuitry allows single positive supply operation at very low DC current with control inputs compatible with CMOS and most TTL logic families. No DC blocking capacitors are required on RF I/O ports.

Electrical Specifications, T_A = +25° C, Vdd = +5 Vdc, 50 Ohm System

Parameter		Frequency	Min.	Typ.	Max.	Units
Insertion Loss		5.0 - 6.0 GHz 5.1 - 5.4 GHz 5.4 - 5.9 GHz		1.3 1.2 1.3	1.6 1.5 1.6	dB dB dB
Isolation		5.0 - 6.0 GHz 5.1 - 5.4 GHz 5.4 - 5.9 GHz	20 26 22	24 31 27		dB dB dB
Return Loss	RF Common RF1 & RF2	5.0 - 6.0 GHz 5.1 - 5.9 GHz 5.0 - 6.0 GHz 5.1 - 5.9 GHz	11 12 11 11	15 16 14 15		dB dB dB dB
Input Power for 1 dB Compression	0/3V Control 0/5V Control	5.0 - 6.0 GHz 5.0 - 6.0 GHz	27 29	31 33		dBm dBm
Input Third Order Intercept	0/3V Control 0/5V Control	5.0 - 6.0 GHz 5.0 - 6.0 GHz	31 33	35 37		dBm dBm
Switching Characteristics		5.0 - 6.0 GHz				
	tRISE, tFALL (10/90% RF)			10		ns
	tON, tOFF (50% CTL to 10/90% RF)			25		ns

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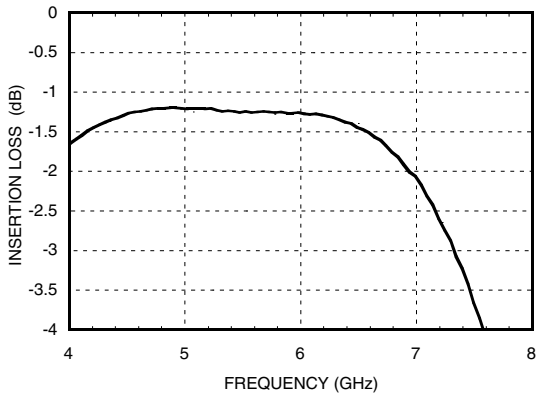
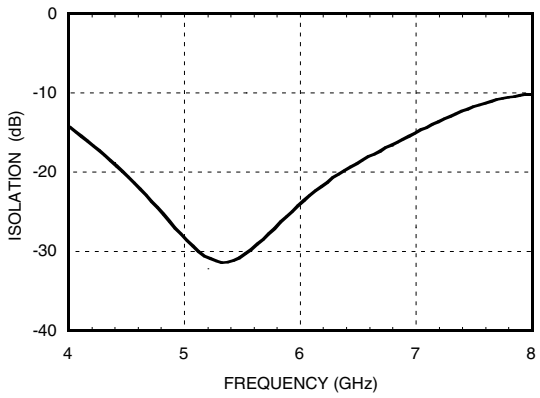
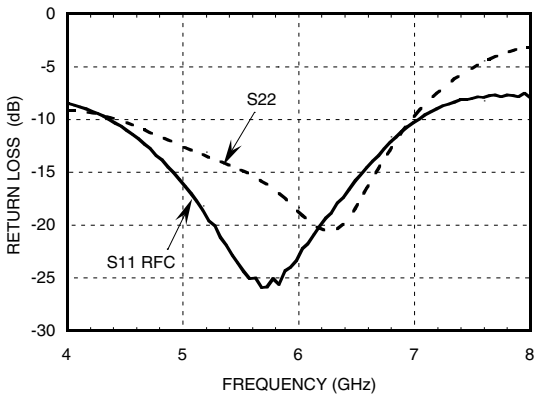
Insertion Loss



Isolation



Return Loss



Absolute Maximum Ratings

Bias Voltage Range (Vdd)	-0.2 to +12 Vdc
Control Voltage Range (A & B)	-0.2 to Vdd Vdc
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C

Truth Table

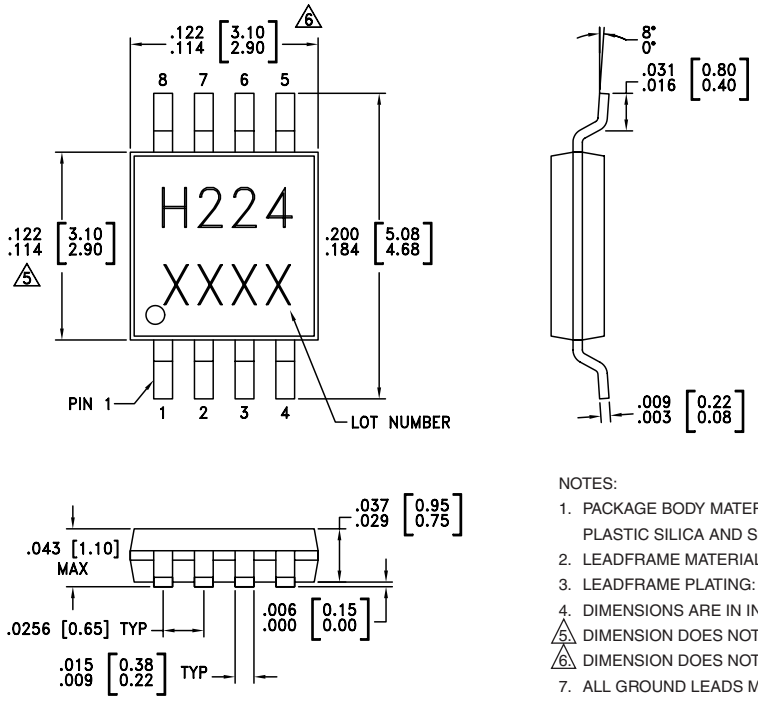
***Control Input Voltage Tolerances are ± 0.2 Vdc.**

Bias	Control Input*		Bias Current	Control Current	Control Current	Signal Path State	
Vdd (Vdc)	A (Vdc)	B (Vdc)	Idd (uA)	Ia (uA)	Ib (uA)	RF to RF1	RF to RF2
3	0	0	10	-5	-5	OFF	OFF
3	0	Vdd	10	-10	0	ON	OFF
3	Vdd	0	10	0	-10	OFF	ON
5	0	0	45	-22	-23	OFF	OFF
5	0	Vdd	45	-5	-40	ON	OFF
5	Vdd	0	115	-40	-5	OFF	ON

Caution: Do not operate in 1dB compression at power levels above +33 dBm and do not "hot switch" power levels greater than +23 dBm (Vdd = +5Vdc).

DC blocks are not required at ports RFC, RF1 and RF2.

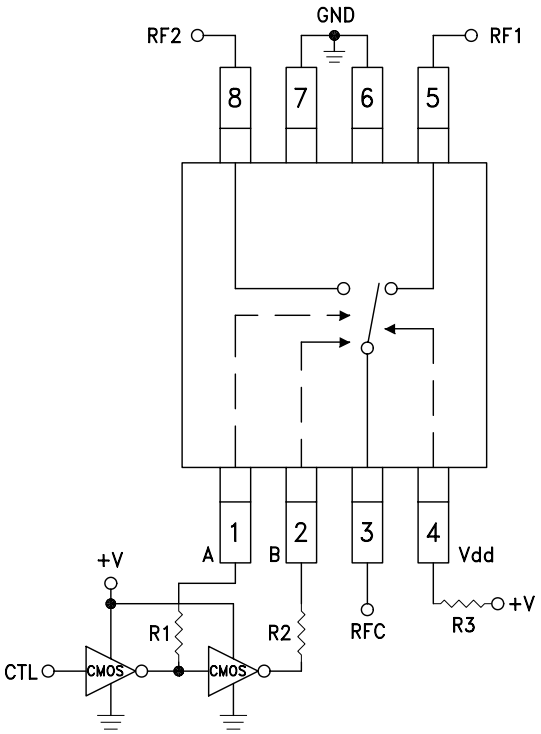
Outline Drawing



NOTES:

1. PACKAGE BODY MATERIAL: LOW STRESS INJECTION MOLDED PLASTIC SILICA AND SILICON IMPREGNATED.
2. LEADFRAME MATERIAL: COPPER ALLOY
3. LEADFRAME PLATING: Sn/Pb SOLDER
4. DIMENSIONS ARE IN INCHES [MILLIMETERS].
5. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15mm PER SIDE.
6. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.25mm PER SIDE.
7. ALL GROUND LEADS MUST BE SOLDERED TO PCB RF GROUND.

Typical Application Circuit



Notes:

1. Control Inputs A and B can be driven directly with CMOS logic (HC) with V of 3 to 8 Volts applied to the CMOS logic gates and to pin 4 of the RF switch.
2. Set V to 5 Volts and use HCT series logic to provide a TTL driver interface.
3. Highest RF signal power capability is achieved with V set to +10V. However, the switch will operate properly (but at lower RF power capability) at bias voltages down to +3V.
4. RF ByPass: Do not use RF bypass capacitors on Vdd, A or B ports. Resistors R1, R2, R3 = 100 Ohms should be placed close to the Vdd, A and B ports. Use resistor size 0402 to minimize parasitic inductances and capacitances.
5. DC Blocking capacitors are not required for each RF port.
6. Evaluation PCB available.

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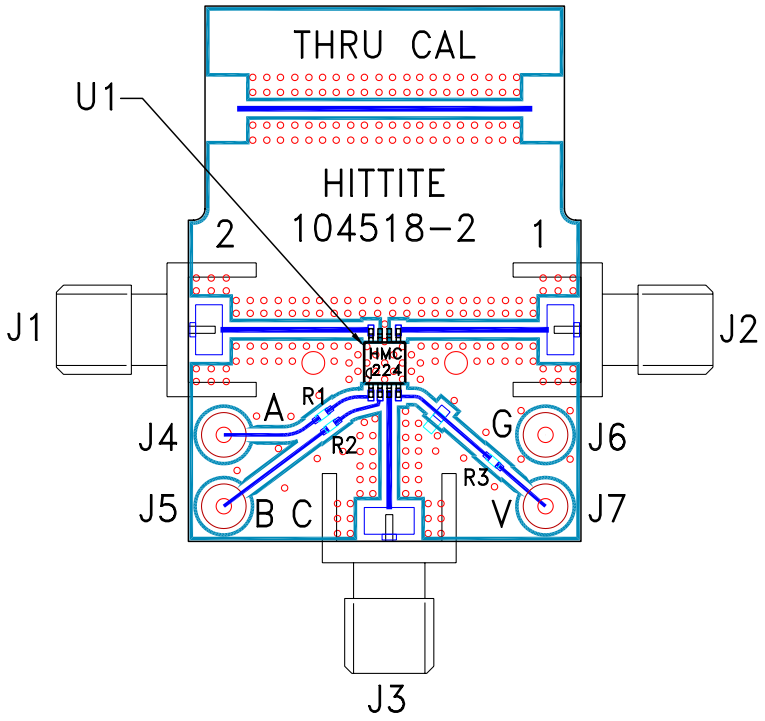
Evaluation PCB



List of Material

Item	Description
J1 - J3	PC Mount SMA RF Connector
J4 - J7	DC Pin
R1, R3	100 Ω resistor, 0402 Pkg.
U1	HMC224MS8 T/R Switch
PCB*	104518 Evaluation PCB
* Circuit Board Material: Rogers 4350	

The circuit board used in the final application should be generated with proper RF circuit design techniques. Signal lines at the RF port should have 50 ohm impedance and the package ground leads should be connected directly to the ground plane similar to that shown above. The evaluation circuit board shown above is available from Hittite Microwave Corporation upon request.